Meeting Minutes
Decommissioning Community Workgroup Meeting (#15)
Tuesday, April 15, 2003
Saint John's Lutheran Church (Milan Township)

The meeting began at 7 p.m. Present were the following Workgroup members: John Blakeman; Janet Bohne; Mark Bohne; Jeff Fantozzi; Ralph Roshong; Bob Speers; Stan Taylor and Lantana Wood. Also present were: Keith Peecook, Sally Harrington, Peter Kolb and Frank Greco (NASA); Sheryl Leeper and Andy Coleman (U.S. Army Corps of Engineers); Kurt Geber and Chuck Fellhauer (Argonne National Laboratory); Jeff LeBlanc (Montgomery Watson Harza); and Susan Santos and Michael Morgan (FOCUS GROUP). Eight members of the public signed the attendance list, including NASA retirees Len Homyak, Paul Mainzer and Dick Sweeting.

The meeting began with Keith Peecook, NASA Senior Project Engineer, making introductions and welcoming remarks. He noted that Decommissioning Project Manager Tim Polich, was not present due to the recent birth of his son and also observed that the speed of the project was "ramping up". Next, Susan Santos of FOCUS GROUP noted that per the Workgroup members' request at the last meeting, updated copies of a glossary of terms relating to the Decommissioning Project was being distributed, and that Workgroup members should let NASA know if any other terms should be added. She requested and received approval of the January meeting minutes, noting that copies of all minutes are on file at the Decommissioning Project's Community Information Bank at the BGSU Firelands Library. Susan then briefly reviewed the April meeting agenda and introduced Peter Kolb, NASA's Environmental Manager, who gave a presentation on environmental monitoring results.

Peter began his presentation noting that NASA developed a comprehensive Sampling Plan and is "still collecting baseline data," with a focus on "radiological constituents" in the air, surface water, groundwater and sediment around the Reactor Facility. Air samples are collected weekly at six locations, including sites upwind of, at, and downwind of the Reactor Facility – at the North, South, East and West fence lines – as well as at stations to the Southwest (upwind) and to the Northeast (downwind). Peter next described the EPA established methodologies to conduct an analysis "for gross alpha and beta content." He added that monthly composite samples are sent to an off-site certified laboratory for analysis and noted that in addition to radiological constituents, NASA also analyzes for eight metals: Arsenic; Beryllium; Cadmium; Chromium; Copper; Lead; Mercury and Nickel. These metals were selected because they are common metals found in building materials. Increased detection of these metals at the PBRF fence line may suggest an increase in dust migration from the site due to decommissioning activities.

Workgroup member John Blakeman asked why there was both on-site and off-site Alpha and Beta analysis, with Peter explaining that "on-site, we're looking for things that might have happened recently inside the building, some kind of activity." Sheryl Leeper, Environmental Manager for the U.S. Army Corps of Engineers, added that NASA is using the off-site lab as a "quality check for the on-site" analysis, noting that "we have great coordination" between the on-site and off-site labs. Keith Peecook also mentioned the time lag that exists for getting results from the certified off-site lab and that NASA uses the on-site lab analysis as a way "to get results quickly." He also said the on-site lab is not a certified lab but we used it" during the years since the facility was shut down but now "we want something (analyzed) at a certified lab and that means sending it off site.

Peter provided more detail on the sampling methodology and equipment used at the six air sampling stations. He described the continuous monitoring done with high-volume, low-flow

devices used for the air sampling, which operate at a minimum of two cubic feet per minute. Keith added that the upwind station is about a half mile away from the Reactor Facility fence line and the down wind station is about a mile away. He described the monthly sampling for radiation in surface water and sediments and showed the six on site locations – upstream of, at, and downstream of the Reactor Facility. He added that surface water and sediment samples are collected on a monthly basis and are also sent to an off-site, certified laboratory, where they are analyzed for gross alpha and gross beta. Sediments are also analyzed with a gamma spectroscopy, using the U.S. Department of Energy methodology.

Peter then described groundwater sampling, noting that although the Decommissioning Plan calls for sampling only two deep wells on a monthly basis, NASA decided to take monthly samples at three deep wells, three shallow wells and one building sump. In addition, he noted, NASA conducts annual groundwater samples at a total of five deep wells, ten shallow wells and four building sumps. Keith added that these are existing wells that were monitored throughout the Reactor Facility's operational lifetime; and had been monitored quarterly since the facility's shutdown in 1973, "up to the time we stepped up our monitoring program in 2001." He noted that during this entire period, the results were "below minimum detectable levels, essentially zero."

Keith then introduced Sheryl Leeper, the Environmental Manager for the USACE, who presented an analysis of the environmental sampling results. She described Project Specific Action Limits, that NASA uses to compare monitoring results, explaining that they are employed in order to "see what is happening on site and how it affects the environment." She added that if analytical results begin to approach these Action Limits, they "trigger what we may need to do" in terms of possible actions, which could include additional sampling, more detailed analysis of the samples, an in-depth review of project operations and/or determining appropriate mitigation measures.

She said that gross alpha and gross beta are the first steps in the sampling analysis, followed by a look at any trends in the data. She then reviewed the results of air samples collected from May 2001 to October 2002. Sheryl noted that gross alpha in these air samples during this period had been "almost exactly the same" and said she had asked herself why.; Then she explained that this was because "the air was the same…we're not causing anything to occur and there has been no great variation" between the results, adding that the same had been true for the gross beta air analysis. She said that both were well below the Project Specific Action Limits. Next, Sheryl discussed some of the metals analysis results for the air sampling and said that if there is (detectable) metal at the fence line, then it usually means, "I'm causing dust." She said she also looks at "what's happening around the fence line" what are the results both upwind and downwind, and "any big variations," but noted there have been "no significant variations" between the upwind and downwind air sampling results "which is what you would expect. NASA retiree Len Homyak, who once worked at the Reactor Facility, asked if she were looking at data from 2002 and Sheryl said she was, adding that she went back to May 2001 and established a background. Workgroup member Bob Speers asked about prevailing winds and Sheryl noted that there is a station to the east of the Reactor Facility that is "downwind, based on the prevailing wind."

Sheryl then reviewed the results of the surface water sampling, noting that the data for Station 1 (located near the Pentolite Ditch) is not continuous because "it's dry a lot of the time." She observed that it is an "intermittent tributary," adding that there are also times when ice prevents the collection of samples. She also said "we came up with a Project Specific Action Limit" of 20 pico curies per liter for gross alpha water samples and "except for a few peaks here and there, (the levels) are pretty stable." [Note: only twice in the 20 samples taken, has the level reached the Project Specific Action Limit]. She pointed out that the sampling results were even far less for

gross beta, which has an Action Limit of 500 pico Curies (only five of the 20 samples have shown a level higher than 30 pico Curies, with one-time high of less than 70). Bob Speers asked about "occasional spikes" in the data at three stations. Sheryl said these spikes tended to occur during drier periods (July and October). Keith pointed out that “we’re well below the Acton Limit,” which he explained was “an annual moving average … very low.” He added that as results approach our established Action Limits, they trigger the project to begin additional actions as the collection of additional samples, and more speciated analysis, to determine exact nuclides.

In terms of the sediment analysis results, Sheryl remarked that there is no regulatory limit for sediment. She explained that NASA and USACE look at “Background levels” at Stations 1, 4 and 9, adding, “We used these to come up with a Project Specific Action Limit” of 25 pico Curies per gram, because these stations are removed from any impacts from the Reactor Facility. During the fall of 2002, she said the radiation levels in sediment for Gross Alpha had started to “trend upward,” and said she has subsequently been looking at the data since then “to see what happens.” Sheryl noted that Station 9 has the highest results but it had “nothing to do with decommissioning,” as the monitoring station is farthest away from the Reactor Facility; but she added she has sent the samples back to further speciate the nuclides to determine if they are specific to decommissioning operations or are naturally occurring. Keith pointed out that Station 2 (on Pentolite Road, near an aqueduct) would tend to be the most impacted “because that’s where our outfall is,” adding, “we did not get to our Action Limits” and peaked in November l (during dry periods. He also said that there had been no samples taken in January 2003 “because it had frozen over.” Kurt Geber of Argonne National Laboratory made the observation that the levels were so extremely low, that they were the levels of exposure a person would get from a dental X Ray - while standing across the street.

Next, Kurt Geber gave a presentation on the Decommissioning Project’s Radiation Protection Program that he oversees, noting that as the project's Radiation Safety Officer, he is committed to protecting the public, the workers and the environment during decommissioning. He said most of the radiation safety work is done by Heath Physics Technicians (HP Techs), explaining that the project training program qualifies three levels of HP techs – junior, full and senior. John Blakeman asked if the HP techs were contractors and Kurt noted they are with the project subcontractor Framatome. He said the HP techs continually monitor the radiological status of operations adding that some crews constantly work with radioactive materials, (cutting, sawing, and welding) and need the most job coverage. He said the main goal of the radiation protection program is to prevent unnecessary radiation exposures.

Kurt briefly reviewed the amount of radioactivity in the Reactor Facility and noted that there are approximately 37,000 curies in the reactor core, consisting mostly of cobalt-60, cesium-137, and tritium. He pointed out that tritium is not going to be the problem we were anticipating. Janet Bohne asked about its half-life, with Kurt responding that the half-life of tritium is about 12 years. This means that about every 12 years, the inventory is reduced by half. He also said the Hot Dry Storage area of the Reactor Facility has about 9,000 curies. Len Homyak – who was a NASA Plum Brook Reactor engineer – asked if the tritium was contained in the beryllium plates and Kurt responded affirmatively., He said Framatome had recently completed a tritium hazard analysis that predicted that the tritium would remain bound to the beryllium plates, even in the presence of moist air. The only concern would be in the event of a beryllium plate breaking, but that specially designed tooling was planned to prevent any such problem.

Keith explained that the reactor tank had been kept in a “dry nitrogen purge” from the time the Reactor Facility was closed up until the day last November when NASA conducted a reactor tank entry. He said NASA discovered that “ambient air had displaced the nitrogen” and that there had

been a considerable amount of decay in the tritium in the past 30 years. While the level was between 22,000 and 23,000 Curies in 1978, Keith said that by last year the levels were “just a fraction” of the previous amount. Kurt noted that NASA’s decision in 1973 to postpone decommissioning, made was well conceived because if effectively reduced the amount of radioactive material five-fold through natural decay. He also added that the engineers and technicians that prepared the reactor for safe storage did an excellent job. The levels of contamination that are being found are very low because of their thoroughness when the facility was closed. Noting the measurements taken in 1978, John Blakeman asked if the Reactor Facility could have been safely decommissioned that year. Keith said it could have been, in accordance with the safety standards of the day. NASA Program Manager Frank Greco noted, “The people who ceased operations (in 1973) did it right."

Kurt discussed radiation exposure with regard to the ALARA (As Low As Reasonably Achievable) Principle noting the importance of using time, distance and shielding in keeping external exposure levels as low as possible. Time has a linear relationship with exposure, distance has an inverse relationship and shielding reduces exposure rates exponentially. He pointed out the internal and external dose limits for nuclear workers, noting that the routes for internal exposure, inhalation, ingestion (hand to mouth contact) and skin penetration or absorption, are managed primarily by containing and controlling the radioactivity at its source. Kurt emphasized that the regulatory limit for total exposure, whether internal or external, is 5,000 millirem (5 rem). Then he pointed out that the regulatory dose limit for a member of the public is 100 millirem, which is one-fiftieth that of the nuclear worker. He also reminded us that we are all constantly exposed to radiation from a variety of naturally occurring sources.

A member of the public asked how many workers were involved with decommissioning, and how many HP techs monitor them. Kurt said that last year 126 workers were monitored by about 6 HP techs and that there were several other radiation protection specialists supporting the project. He also said that everyone working within the Reactor Facility fence line is monitored with either a TLD (thermoluminescence dosimeter) or a self-reading dosimeter.Next, Kurt discussed administrative controls in place on the project, including the daily exposure limits for each worker on the project. The limits are as follows: 100 millrem per week, 250 millirem per month and 1,000 millirem (1 rem) per year, noting that NASA’s latter figure is much less -- just one fifth of the regulatory limit. He noted that while there are provisions through which work on the project can exceed the administrative limits, they would only be considered after a thorough review to see if there is sufficient justification (e.g., alternative techniques not feasible and all practical administrative and engineering controls been considered).

In discussing additional administrative controls, Kurt explained the importance of reviewing job history files, to find past information on difficulties encountered doing similar work or previous work on the same system. He also noted the need to pre-assemble and pre-stage tools and equipment, to the greatest extent possible, in areas of low radiation levels as a means of reducing worker exposures. Len asked how much radiation exposure the NASA crew encountered in removing the shrapnel shield above the reactor tank last November when the first tank investigation was made. Kurt said about 3 millirem per hour at the edge of the Lily Pad, with Keith noting that the exposure rate on the area directly atop the reactor tank was about 50 millirem per hour. He added that with the tank lid on the highest exposure was 400 millirem per hour; with the lid off, the highest exposure was 1,000 millirem per hour. Kurt then noted that, at the highest levels, a person would reach the 5,000-millirem annual dose limit after working for 5 hours. He also stressed the need to share the exposure among several workers, by several persons receiving small exposures is preferred to one individual receiving a large exposure.

Kurt then explained how engineered controls were used during the first reactor tank investigation, last November, to reduce worker exposures. Long handled tools with remote video cameras and radiation detectors were used to maximize the distance between workers and the radiation sources. Because of the unknowns associated with the tank atmosphere, a "glove bag" containment was used through which the remote tooling was manipulated. Air purifying respirators were worn during the installation of the glove bag and until air sampling results indicated they were no longer necessary. And operations were conducted from a shielded work platform. The important information gleaned from the post-job ALARA review of the first reactor tank investigation allowed for the second reactor tank investigation, performed earlier today, to be conducted more efficiently and with less radiation exposure to the workers.

The temporary air ventilation system was described next. It was designed to remove particulates from the air in the containment vessel (CV). The system is HEPA (High Efficiency Particulate Air) Filtered with a removal efficiency of a 99.97% and a design rating of24,000 cubic feet of air per minute. He explained that the air in the Reactor Facility is continuously monitored, and that the goal is to enable most of the project workers to operate inside the containment vessel without the need for respirators. Workgroup member Lantana Wood asked how often the HEPA filters change the air within the containment vessel and Kurt said twice per hour. Keith explained hat the previous ventilation system had not been used for 30 years and that NASA decided it was both better and safer to use a new system for decommissioning. Air is sampled from the general work area for routine monitoring, but special breathing zone monitors are used to sample the air within 12 inches of the worker's face.

Kurt then discussed other control measures used to prevent contamination of workers such as the use of protective clothing. He passed around a lightweight, protective suit made from breathable nylon. He showed rubber shoes (similar to Totes® rain gear) that are worn with the suits and fit over the steel-toed shoes that workers must wear. In addition, he discussed other individual monitoring devices worn by workers, such as TLD's, noting that the personal dosimeters contain special crystal chips, that when exposed to radiation, absorb energy released in the form of light that is measured during processing. The processing of TLDs involves heating the crystal chips to release the stored energy. TLDs can be reused over and over again. Kurt also mentioned "pencil meter" dosimeters (such as the ones worn on the Workgroup's Reactor Tour last year) which enable wearers to read their accumulated dose. He also talked about electronic dosimeters, which offer a lot more convenience because they can be used as miniature radiation meters with alarm set points and computer interfaces, however their weight is significantly more than their less expensive alternatives. Kurt said there are times when it is necessary for workers to wear HEPA filtered respirators and explained that workers required to use respirators must be trained, medically qualified, and fit-tested on the specific make and model they will wear at the Fermi Nuclear Plant in Michigan. In order to wear a respirator, he said people must have a clean, smooth surface to seal to. Kurt passed around a respirator mask and filter cartridges, as well as a pencil meter and a portable radiation survey meter identical to the kind HP techs use in the field to measure radiation.

John Blakeman asked if workers ever use self-contained breathing air tanks. Kurt responded that SCBA are frequently used in industrial environments where IDLH (immediately dangerous to life and health) atmospheres exist, where the highest level of worker protection is required. He added that he does not anticipate that air quality during the decommissioning will diminish to the point of requiring that level of respiratory protection and noted that NASA has a regulatory requirement to exhaust administrative and engineering controls before we utilize respirators. Frank Greco also pointed out that if the workers are wearing tanks, they must stay in the area of higher exposure for

longer periods of time, thus defeating the purpose of ALARA. But Keith said the SCBA type gear remains as an option." Janet Bohne asked how long workers operate in the protective suits and Keith responded that this would be "driven by temperatures" and what the workers would do on a normal construction site – noting that the workers come out of the area for breaks. Jeff LeBlanc, Project Manager for general contractor Montgomery Watson Harza, added that the typical shift while wearing the suits was from 2 to 2 ½ hours. Keith said that when a worker leaves for a break, (s)he must take the suit off, be monitored for contamination, then put a new suit on after the break.

Finally, Kurt talked about the project's bioassay program, which monitors individuals for internally deposited radioactive material. The bioassay program is also important for evaluating the effective ness of the radiological controls and area monitoring programs. He said a worker may be asked to provide a specimen to be to a laboratory for analysis. Before starting work inside the reactor facility, personnel are sent to Fermi Nuclear Plant for a whole body count, to document a baseline of any internal radioactivity. The whole body count is a measure of radiation emitted from a person's body with a very sensitive radiation detector. It detects naturally occurring radioactive material, as well as anything that might be specific to the nuclear industry. At the project site, whole body counts are repeated annually and anytime there is an indication that personnel may have been internally exposed to radioactive material. He summarized the year 2002 personal monitoring results for workers, noting that they were very favorable. The collective exposure for 126 workers was just over 608 mrem, with 119 receiving no detectable exposure. The highest exposure to any worker was 143 mrem. Keith pointed out, that only seven people got any dose at all and that was during the reactor tank investigation. He added that bioassay results for the decommissioning workers had been all came back negative.

Keith followed Kurt's presentation with a Project Update. He noted that that the Reactor Facility's original electrical system had gone what is termed "cold and dark," replaced by a new system in place for the lifetime of the project. By rendering the old system "cold and dark," he said NASA accomplished a safety milestone, ensuring that no wires that may have been previously unaccounted for could be cut during the project, causing possible injury or damage. He noted that NASA had employed a local contractor, Fresch Electric, to install the new system, adding that NASA had employed at least a half dozen local contractors this far on the project. Keith showed slides of recent work on the project that depicted the finalized installation of the Cask Transfer System, which will be used to move cut pieces of the reactor internal and tank out of the containment vessel area. Then he noted the 20-ton "polar crane," which was shown lifting pieces of loose and fixed equipment that are being removed from the containment vessel area to facilitate segmentation. The crane will also be used to fill cask liners with cut pieces of the reactor internals and tank during segmentation. In more good news, he said the subcontractor that will perform the segmentation work on the reactor internals and tank (Wachs Technical Services) is "ready to come on site" and will be at the Reactor Facility later in April.

Keith also noted that NASA had shipped six boxes of loose equipment, containing low-level radioactive waste, from Plum Brook Station to the Alaron licensed reprocessing facility in Pennsylvania on April 10. He said NASA would pick up the pace of loose and fixed equipment shipments to Alaron, and also to the Barnwell and Envirocare licensed facilities. John Blakeman asked about the shipments to the disposal facilities, with Keith explaining that all the waste from decommissioning is dry, solid and low-level. But he also noted that the wastes (from segmentation) with the highest of the low levels (Class B and C wastes) would be sent to the Barnwell licensed facility in South Carolina. He also said that most of the project waste is Class A (the lowest level) and will be sent to the Envirocare licensed facility in Utah.

Keith briefly discussed upcoming activities, including a second reactor tank entry that NASA conducted earlier in the day on April 15 to better understand the content of materials inside the tank. He also said that the Decommissioning team had made revisions to the plans and approach to segmentation and, in particular, that they decided that they would begin segmentation by removing the components of the reactor tank, termed Horizontal Beam Tubes, that contain much of the radiation remaining in the tank. He noted that NASA had decided to reengineer its work platform, for removing the tubes because "the (projected) dose field had been too high". He said the plan now is to take these tubes out first, by removing the top off the reactor tank and working from behind a steel wall to minimize exposure. John Blakeman asked if the tubes were made of aluminum and Keith said they were, but had stainless steel components that increased the amount of activated metal.

Keith also noted that 15 NASA retirees, who once worked at the Reactor Facility, have provided considerable information and perspective on the contents of the reactor tank and other areas of the facility. He added that Wachs would work on the old mock-up reactor in the facility, which he said is a "95% accurate" replication of the reactor as part of their mock-up training using the actual tools they intend to use for segmentation. Keith said NASA anticipated beginning actual segmentation work in June and removing the reactor internals and horizontal beam tubes in July, with removal of the material from the Hot Dry Storage area of the Reactor facility during 2004. By that time, he said, "we will have removed 95% of the radiation" from the facility.
In following up with requests form Workgroup members, Keith then presented the Decommissioning Project organizational chart, stressing that NASA is responsible for the project, and that "we provide the oversight." (See chart)

Sally Harrington, of the NASA Glenn Community and Media Relations Office, then spoke briefly on Community Outreach activities. She noted that the seventh edition of the Decommissioning Project Newsletter had been published the week before and sent to everyone on the project's 2,100-member mailing list. She thanked Workgroup members John Blakeman and Lantana Wood, who staffed a NASA table at the Parent Teacher Organization Fair held at Perkins High School in March. John and Lantana handed out some 200 refrigerator magnets containing updated Decommissioning Project information and scores of fact sheets and other material, and were well-received by the hundreds of attendees at the fair. She also noted that NASA would sent postcard/magnet combinations to everyone on the mailing list later this spring. She also said NASA would be sending letters to two community members, inviting them to join the Workgroup, and would also send a project update letter and literature to local and county public officials. While not associated with Decommissioning, Sally mentioned that NASA has initiated an Educator Astronaut Program and is encouraging students and parents to nominate a teacher to join the astronaut program.

Frank Greco noted that USACE Resident Manager Wes Watson was being assigned a new project and would be leaving the Decommissioning Project with the next few weeks, and expected that the new Resident Manager would be in place by July - and would attend the next Workgroup meeting. Susan Santos noted that at the July meeting, NASA would also share progress of Wachs' work on the project and encouraged Workgroup members to send suggestions for July agenda items. She also noted that Peter Kolb and Sheryl Leeper would send copies of the Environmental Sampling Report to anyone signing up for a copy and distributed a sign up sheet.

The meeting adjourned at 9:30 p.m.